

EAS MASTER BEEKEEPER WRITTEN EXAM 2017 DELAWARE

THE EAS Written Exam has 47 questions totaling 100 points. The passing grade is 85 percent or better. Read questions carefully. Answer the question asked and do NOT assume anything intended or implied. **If unclear, ASK for clarification.**

TRUE FALSE (2 points each). Indicate by checking first box if entire statement is TRUE or second box if any portion is FALSE. You may write a short statement, if you feel it important to qualify your answer. (NOTE: * 1/3rd > missed, **1/2 > missed)

1. TRUE FALSE. Drone-brood trapping and then freezing to kill mites reproducing in the drone cells is an effective, non-chemical method to control varroa in the fall months when mite numbers are normally elevated. **ANS F Spring YES NOT FALL as bees not likely to rear drones**

2. TRUE FALSE. Your package bee colony (originally from GA) replaces its queen and suddenly becomes very difficult to handle; when opened many bees attempt to sting. This means you must now have Africanized (killer) bees. **ANS F Least likely explanation is Africanized bees**

3. TRUE FALSE. When monitoring mite level, it is recommended that a 300-bee sample be used; if there are 6 mites washed from the adult sample it would mean mite numbers are elevated and mite control needs be considered immediately. ****ANS f 2% infestation is NOT high**

4. TRUE FALSE. Feeding pollen patties in the winter when bees can't take cleansing flights can create gut conditions favorable for nosema and might lead to dysentery. ****ANS T**

5. TRUE FALSE. Varroa mites can be transferred from one foraging bee to another via flowering plants. ***ANS T (NOT major but one way they "find" a new home.)**

6. TRUE FALSE. To remain healthy, pollen obtained from a monocultural planted crop should provide bees with the correct percentage and type of amino acids needed in the bee diet but many do not. ***ANS T (double negative question confusing)**

7. TRUE FALSE. Like caterpillars, when honey bee eggs hatch the larval stage eats the remains of the egg shell. **ANS F they lack chewing mouthparts, the egg dissolves into a larva**

8. TRUE FALSE. Top supering means adding another super just above the brood nest. **ANS F top supering means adding supers on top of existing supers**

9. TRUE FALSE. Mite Away Quick strip (MAQS) is the only chemical control that can kill varroa mites reproducing within capped brood cells. **ANS T Only this formic acid penetrates cappings**
10. TRUE FALSE. Forage-aged bees have a reduced dietary need for pollen but have an increased nutritional need for carbohydrate. **ANS T**
11. TRUE FALSE. Unlike humans, bees cannot biosynthesize (i.e. generate internally) cholesterol and must get it from pollen or pollen supplements. **ANS T**
12. TRUE FALSE. Laying workers produce only drones. These drones have been shown to be able to produce viable sperm and can inseminate a virgin queen. **ANS T**
13. TRUE FALSE. The frames of Top bar hives are not removable and such hives are illegal in most states. **ANS F They can be removable (if TB hive managed) & therefore not illegal**

2 questions from 2nd MB exam 1982 (35 years ago)

14. TRUE FALSE. The most appropriate method of eliminating the possibility of wax moth in section comb honey is by placing the honey in a freezer. **ANS T**
15. TRUE FALSE. American foulbrood spores have been known to survive at least 30 years in beeswax comb. **ANS T**

MULTIPLE CHOICE (2 points each) Circle the one best alternative choice – you may write a short comment in margin if you feel you must qualify your answer.

16. The number one foraging need for a summer (non-flow period) colony is _____. If there is open brood, summer foragers will need to forage flowers that provide _____. The “default” forage in any season is _____ **ANS B**

- a. nectar, water, pollen
- b. water pollen, nectar**
- c. pollen nectar, nectar
- d. propolis, pollen, nectar
- e. nectar, pollen, propolis

17. In honey bees, the subgenal organ in the tibia of the worker bee leg picks up sound as vibrations. What other structure in the honey bee picks up sound? * **ANS C (NOT a)**

- a. tip of worker antenna
- b. tip of worker abdomen
- c. Johnston's organ in pedicel of worker antennae**
- d. palpi of labium
- e. Dufour's organ of abdomen

18. The thermal chimney thought to be an important feature for overwinter survival of a bee tree colony is not present in which of these following hive types? **ANS A**

- a. Kenyan top Bar**
- b. Langstroth 8 frame
- c. Warré
- d. Langstroth 10 frame
- e. "original" Langstroth hive

19. The piece of "extra" equipment termed a Vivaldi board or quilt box is used by beekeepers for what purpose? **ANS D**

- a. feeding bees
- b. to reduce swarming and provide more warmth above the bottom board for better utilization of lowest brood box in the spring
- c. assist in providing space at top of colony when using a fumigant pesticide such as Apiguard
- d. provide winter insulation at top of colony**
- e. none of the above

20. If your heaviest Spring nectar flow starts on average between May 15-30, how far ahead do you need to stimulate your queen to lay eggs so that the hive has the greatest number of foragers to capture the nectar flow? ***ANS D (not c or e)**

- a. Within the week
- b. 2-3 weeks before
- c. 3-4 weeks before
- d. 5-6 weeks in advance**
- e. Sooner/later than any of above choices

21. If you see EFB or Chalkbrood in early to mid-spring, the 2 best management options are:

- a. feed & vent moisture and wait for colony to recover **ANS A** **CIRCLE 2**
- b. add antibiotic fumagillin to colony
- c. feed tylenol to colony
- d. requeen colony later in season, once colony recovers **ANS D**
- e. feed antibiotic terramycin in sugar syrup (NOT c or e)

22. If you see elevated mite numbers in any colony in your apiary as a “responsible, good neighbor beekeeper” you should: **ANS B (credit given for c answer as well)**

- a. do nothing but be prepared to buy replacement bees next spring
- b. treat all colonies if one or more exceed “acceptable” mite levels
- c. treat the colony(ies) with high mite numbers and continue to monitor mite levels in non-treated colonies (For some situations this is reasonable – not larger scale beeks)
- d. Wait 1-2 weeks to re-monitor as you might have a false positive
- e. treat with synthetic miticide Apivar to get a rapid mite kill to insure the colony with high numbers doesn’t become a “mite bomb” and spread mites to other colonies

23. The Honey bee worker hind leg lacks **ANS C**

- a. arolium **NOT a**
- b. pollen basket
- c. antennal cleaner
- d. spines
- e. tibia

24. A. bait hive is **ANS F**

- a. a smaller version of a standard colony
- b. another name for split/divide
- c. best if placed on hive stand within an apiary
- d. supplied with honey/sugar water
- e. a way to insure survival of selected stock
- f. none of the above

25. Honey crystallized in beeswax comb cells **ANS A**

- a. can be fed back to bees
- b. should be put in hot room (temp 105°-115° F) to reliquify
- c. signifies non-adulterated to customers
- d. should only be fed to bees in the late fall or early spring
- e. might result when high fructose corn syrup is fed to bees (NOT e)

26. The most common pesticide residue we detect in honey bee tissue is **** ANS D (NOT c)**

- a. Amitraz
- b. MAQS (Mite Away Quick strips)
- c. clothianidin (a neonicotinoid)
- d. chlorpyrifos
- e. Thymol

27. To try to halt colony swarm preparations in a late spring colony what might be management option(s): ***ANS F (NOT d or e)**

- a. Transfer 2-3 frames with queen cells, brood and adhering adult bees to make a divide.
- b. Smash or remove all queen cells and open brood area by adding empty drawn frames
- c. Smash or remove all developing queen cells, put queen into cage for 3-5 days and subsequently reintroduce her or requeen in 3-5 days with newly purchased queen.
- d. One of the a, b, c, options above (which one? _____)
- e. Two of the a, b, c options above (which two? _____)
- f. all 3 a, b, c options above

28. Bee PMS (Parasitic Mite Syndrome) is often a sign of poor bee health. Symptoms include

- a. snot brood and high mite numbers in colony **ANS A**
- b. no (or few) dead bees but small colony still with honey stores and often brood (***NOT b=CCD**)
- c. sunken, greasy looking brood cappings, developing pupae not white in color
- d. Insufficient adult bee population to cover expanding brood in spring
- e. colony with too few overwintering stores and high mite numbers

29. Package bee installation in early spring should include shaking bees from package into hive adding sugar syrup feeder on colony, and _____ **ANS E (not a)**

- a. direct queen release
- b. foundation frames and any drawn comb frames w/ or w/out honey if available
- c. reducing bottom entrance closure and initially closing all top entrances
- d. 1 of above (which 1? _____)
- e. 2 of above (which 2? _____)
- f. all (a, b, c) options above.

30. Question from 1982 exam: Which gland is source of sex attractant pheromone?? **ANS E**

- a. Nasonov or Nasonof
- b. scent
- c. hypopharyngeal
- d. Dufour
- e. mandibular

FILL INS (2 points each). Supply the one or several words that completes each blank to create a true and accurate statement (each blank = ½ or 1 point).

31. A eusocial unit that includes a queen, many related workers, and a population of drones is considered a/an _____ (**ANS: colony**) while the structure used by the beekeeper to house this society is properly termed a/an _____ (**ANS: beehive**).

32. Natural comb means the beekeeper is not utilizing _____ (**ANS: Foundation**) in an assembled frame. In some hives, natural comb is drawn on a/an _____ (**ANS: top bar**). To ensure the bees build their natural comb in alignment, the beekeeper can provide _____ (**ANS: a starter strip, or a comb guide, or a waxed kerf, or popsicle sticks, (there are lots of acceptable answers.)**) Natural comb is likely to contain some _____ (**ANS: drone**) comb.

33. Pollen provides a colony with its primary dietary source of _____ (**ANS:protein**) Pollen is packed into cells and mixed with enzymes and honey where it undergoes _____ (**ANS: fermentation, malolactic fermentation, lactic acid fermentation**) and changes into what we term _____ (**ANS: bee bread**). Are such cells a mixture or more likely to be a single flower source? _____ (**ANS: mixture**)

34. You discover your bees storing liquids that are distinctly yellow, green, blue, &/or red in color. What is likely source of different colored liquids being stored in the beeswax cells? _____ (**ANS: sugar sweetener from candy/drink factory nearby**). What is most likely sugar source of this material? _____ (**ANS: HFCS**)

35. Using one organism to keep populations of a pest organism in check is termed _____ (**ANS: BioControl**). *Strateolaelaps* (predatory mites) & *Beauveria* (bacteria) have not proven successful in mite control: what common organism is currently under investigation (by BeeFriendly™) for mite control? _____ (**ANS: Metarhizium mushroom mycelium**)

36. Varroa mites might be confused with a Braula bee louse. Provide 2 ways to distinguish between the two 1. _____ and 2. _____ (**ANS: 8 vs 6 legs, body flattened**)

37. We say it takes 21 days for a worker bee to develop from an egg to adult– in actuality it is a range of _____ (ANS: 19-22 days). What caste spends the shortest time to develop? _____ (ANS: queen) and which the longest? _____ (ANS: worker). Capping stage for a queen is _____ days in length (ANS: 7- 8 days). (NOTE: Drone not caste)

38. Two colony differences to distinguish that a colony has absconded (vs leaving as a swarm) are: Absconds 1. _____ and 2. _____ (ANS: absconds do not leave swarm cells; absconds are essentially total hive abandonment by adult bees; absconds are more frequent in fall or when mite numbers are high or there are few foraging resources or colony has been frequently disturbed.)

39. This spring the weather was warm, then cold, then warm again, then cold. With these fluctuating weather conditions, beekeepers looking at brood might have noticed chilled brood. Give two characteristics of dead brood that would lead to a diagnosis of chilled brood: 1. _____ and 2 _____ (ANS: patch(es) of yellow then black brood (larvae & pupae) that bees remove slowly; brood death on fringes of brood area - healthy brood central; reduced size brood spheres)

40. A beekeeper asks if he can put something in the smoker that effectively kills mites. Give 2 reasons why you need say NO do not add anything to smoker because 1. _____ and 2. _____ (ANS: illegal (not registered for mite control); could be dangerous for you or bees; nothing has been shown to be effective so mite control would not result).

41. In the fall you notice these distinctly yellow and black insects flying among your colonies, especially just above the ground. They are likely to be _____ (common name)(ANS: yellowjackets). You believe they are a pest. The most effective, honey bee safe control for them is _____. (ANS: trapping) Where do you place this control? _____ (ANS: within apiary near ground close to hives or outside apiary perimeter). Can honey be salvaged from attacked colonies? _____ (ANS: YES)

42. Ants found inside a bee colony may be seeking _____ or _____. What is one simple non-chemical method to rid a colony of ants found under the hive cover? _____ (ANS: Shelter, food; allow bees to access the area or strengthen the colony) and a chemical ant control option? ____ (ANS: ant poisons)

43. Pollination is the process of transfer of pollen grains from _____ to _____ (ANS: anther to stigma). Among foraging honey bees the most likely to pollinate are those _____

(ANS: pollen foragers). Some flowers need to be buzz pollinated – name two. _____

(ANS: tomato, potato, blueberry, cranberry)

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2 questions from very first MB exam 1981 (35 years ago)

44. Bees in a dry environment may need as much as _____ (ANS: 1-2 gallons) water in a day. Bees older than _____ (ANS: 3 weeks of age) are the gatherers of this water.

45. Honey bees have 6 legs all extending from the _____ (ANS: thoracic) body segment. Each leg contains _____ (ANS: 5) distinct parts with the _____ (ANS: last or tarsal segment) further subdivided. Legs end in claws with _____ between (ANS arolium – pad accepted)

SHORT ESSAY . Select ONE of these two Beekeeping questions (5 points – ANSWER ONE ONLY)

46A. New colonies (hived package bees, nucs, swarm captures, splits) are a management challenge. Give three things the beekeeper should do within the first month to help the new hive expand and then two additional things that should be done over the summer before the bees rear the bees that will rear the fall bees that will overwinter.

OR

46B. A colony inspection starts outside the colony. Give 5 things to look at BEFORE you open the colony and what it might mean for each of the 5 observations outside that you might check or confirm inside.

ANSWER 1 ONLY ON BACK OF PAGE 7

SHORT ESSAY . Select ONE of these two Bee Biology questions (5 points – ANSWER ONE ONLY)

47A. The bee hive is dark, hot, smelly place. Give for each of these 3 hive features (minimum of one each) a total of 5 biological reasons why bee hives are hot, smelly and dark.

A. Dark

B. Hot

C. Smelly

or [This question from 2nd MB exam (1982 -35 years ago)]

47B. When was the concept of Bee space discovered? Who made this discovery? How do we insure bee space is honored in our modern bee colony?

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Key concepts to include in response

46A ANS: Within 1st month 1. FEED FEED FEED 2. Check queen condition (esp splits/swarm/nucs) to insure rapid brood advancement (make sure pkg queen released successfully) + any other 3. reduce entrance for potential robbers/pest 4. add 2nd box (or insure removal/movement from Original box) OR 5. any reasonable answer.

over summer to insure survival over winter 1 Mite check + any other: 2. insure continued development of colony 3. check on progress of any queen events/requeen (swarm especially) 4. transfer honey from stronger colonies 5. don't overinspect.

46B ANS: 1. excessive adult losses 2. possibility of chalkbrood 3. normal flight (pollen coming in /no robbing) 4, adult bees "trembling"/stumbling (Virus) 5. pest evidence (scratching/skunk curds/etc + any 5th possibility 5. obstruction to normal flight (entrance reducer still in/grass growing in front) 6. bearding/lack of flight (signifies (too) strong or weak colony) 7. nectar flow underway 8. + any other reasonable response.

47A dark: 1.proper functioning wax glands 2. heightens scent perception

hot: 1. proper brood rearing temp 2. proper condition to rapidly ripen nectar, 3. ventilation (hot air rises)

smelly: 1. communication via specific pheromones 2. food storage information 3. distribution of smells + any reasonable answer

47B. Concept "discovery" credited in US to Rev L.L.Langstroth 1851 (hive patented in 1852). German Dzierzon's frameless movable-comb hive (1835) may have made "original" discovery with a German patent by Berlepsh also in 1852 but both still had the issue of frames being stuck to top cover and side walls. However principle was used in frame spacing going back at least 2 centuries prior.

Modern Langstroth hive (and hives in other areas of world) are engineered to specific dimensions to use a frame with (may or have not have) shoulders to insure proper spacing. Additionally frames sit on rabbet of hive and have dimensions to insure proper bee spacing between boxes (using frames from different frame constructors may throw dimensions off). Worker foundation used in frames to guide bees in drawing comb. Some individuals prefer smaller foundation starter strip. Non-traditional hives (top bar) have accommodation to "guide" bees in proper spacing of one comb to next.

NOTE: Included are * and ** on some questions – these questions were missed by approximately 1/3rd of candidates and ** by approximately ½ or more of candidates.

NOTE: Questions # 3 and 6 of TRUE/FALSE are extremely poor (# 3 is subjective (and several speakers gave a different interpretation of the 2% threshold issue at EAS) and 6 is a double negative; Multiple choice #22 has two good answers b (the Correct answer) but c is widely thought to be correct (and can be a perfectly good response) and question 27 has too may "moving parts" to be a good question (mainly d and e can be correct too).

12 PASS and 12 FAIL (50%) in 2017 -- Score range 87-59.5